

What is claimed is:

1. A method of managing production quantity in a distribution system where products shipped from at least one factory are stocked in a single delivery center at every predetermined cycle and then supplied to customers from the single delivery center, comprising:

determining a standard inventory quantity of products to be stocked in the single delivery center for a time of at least one predetermined cycle ahead based on a shipment record of the single delivery center; and

determining a total assembly quantity of products to be assembled by the at least one factory for a time of at least one predetermined cycle ahead based on said determined standard inventory quantity of the single delivery center and an actual inventory quantity of the at least one factory.

2. The method according to claim 1,

wherein the at least one factory includes a plurality of factories that produces the same product,

wherein, with regard to the same product, said total assembly quantity is determined for each of the plurality of factories according a predetermined production proportion.

3. The method according to claim 1,
wherein said determining a standard inventory quantity
includes:

determining an approximation curve of variations of a
shipment quantity of the single delivery center based on
the shipment record of the single delivery center; and

determining said standard inventory quantity of the
single delivery center for the time one or more
predetermined cycles ahead based on the determined
approximation curve.

4. The method according to claim 1,
wherein said determining a standard inventory quantity
includes:

determining a first approximation curve of variations
of a shipment quantity of the single delivery center based
on the shipment record of the single delivery center;

determining a gradient of the shipment quantity of the
single delivery center for a current cycle t based on the
determined approximation curve; and

determining a $(t+1)$ -th cycle standard inventory
quantity of the single delivery center based on the
determined gradient.

5. The method according to claim 4,

wherein said (t+1)-th cycle standard inventory quantity of the single delivery center $dSI(t+1)$ is determined for each product according to:

$$dSI(t+1) = dSI(t) + a \times \Omega$$

where "dSI(t)" represents a standard inventory quantity for a current cycle t, "a" represents the determined gradient, and Ω represents a factor which is predetermined according to a product type.

6. The method according to claim 4, further comprising:

determining an (t+1)-th cycle expected shipment quantity of the single delivery center based on said determined (t+1)-th cycle standard inventory quantity of the single delivery center.

7. The method according to claim 6, further comprising:

determining a (t+1)-th cycle standard inventory quantity of the at least one factory based on said determined (t+1)-th cycle standard inventory quantity of the single delivery center.

8. The method according to claim 7,

wherein each of said (t+1)-th cycle expected shipment quantity of the single delivery center and said (t+1)-th

cycle standard inventory quantity of the at least one factory is determined by multiplying said (t+1)-th cycle standard inventory quantity of the single delivery center by a factor.

9. The method according to claim 8, wherein the factor is $1/2$.

10. The method according to claim 8,

wherein said determining a standard inventory quantity includes:

determining a second approximation curve of variations of a shipment quantity of the single delivery center based on the shipment record of the single delivery center and said (t+1)-th cycle expected shipment quantity of the single delivery center;

determining a gradient of the shipment quantity of the single delivery center for the (t+1)-th cycle based on the determined second approximation curve;

determining a (t+2)-th cycle standard inventory quantity of the single delivery center based on the determined gradient for the (t+1)-th cycle; and

determining a (t+2)-th cycle expected shipment quantity of the single delivery center and a (t+2)-th cycle standard inventory quantity of the at least one factory

based on said determined (t+2)-th cycle standard inventory quantity of the single delivery center.

11. The method according to claim 10,

wherein said (t+2)-th cycle standard inventory quantity of the single delivery center $dSI(t+2)$ is determined for each product according to:

$$dSI(t+2) = dSI(t+1) + b \times \Omega$$

where " $dSI(t+1)$ " represents said (t+1)-th cycle standard inventory quantity of the single delivery center, "b" represents the determined gradient for the (t+1) cycle, and Ω represents a factor which is predetermined according to a product type.

12. The method according to claim 11, further comprising:

determining a (t+1)-th cycle shipment quantity of the at least one factory based on said (t+2)-th cycle standard inventory quantity of the single delivery center, said (t+1)-th cycle standard inventory quantity of the single delivery center, an actual inventory quantity of the single delivery center for an end of the current cycle t, and a standard inventory quantity of the single delivery center for the current cycle t.

13. The method according to claim 12,

wherein said determining a standard inventory quantity includes:

determining a third approximation curve of variations of the shipment quantity of the single delivery center based on said (t+1)-th cycle and (t+2)-th cycle expected shipment quantities of the single delivery center;

determining a gradient of the shipment quantity of the single delivery center for the (t+2)-th cycle based on the determined third approximation curve;

determining a (t+3)-th cycle standard inventory quantity of the single delivery center based on the determined gradient for the (t+2)-th cycle; and

determining a (t+3)-th cycle expected shipment quantity of the single delivery center and a (t+3)-th cycle standard inventory quantity of the at least one factory based on said determined (t+3)-th cycle standard inventory quantity of the single delivery center.

14. The method according to claim 13,

wherein said (t+3)-th cycle standard inventory quantity of the single delivery center $dSI(t+3)$ is determined for each product according to:

$$dSI(t+3) = dSI(t+2) + c \times \Omega$$

where "c" represents the determined gradient for the (t+2) cycle.

15. The method according to claim 14, further comprising:

determining a $(t+2)$ -th cycle expected assembly quantity of the at least one factory based on said $(t+3)$ -th cycle standard inventory quantity of the single delivery center, said $(t+1)$ -th cycle expected shipment quantity of the single delivery center, said $(t+2)$ -th cycle expected shipment quantity of the single delivery center, said actual inventory quantity of the single delivery center for the end of the current cycle t , said determined $(t+1)$ -th cycle shipment quantity of the at least one factory, and a shipment quantity of the at least one factory for the current cycle t .

16. The method according to claim 15, further comprising:

determining a $(t+1)$ -th cycle total assembly quantity of the at least one factory by adding a $(t+1)$ -th cycle adjustment assembly quantity determined based on the actual inventory quantity of the at least one factory to a $(t+1)$ -th cycle expected assembly quantity of the at least one factory which has been determined at a $(t-1)$ -th cycle.

17. The method according to claim 15, further comprising:

determining an actual inventory quantity of the at least one factory for a start of the $(t+1)$ cycle based on

an actual inventory quantity of the at least one factory for an end of the current cycle t ;

determining a $(t+1)$ -th cycle adjustment assembly quantity based on said $(t+1)$ -th cycle standard inventory quantity of the at least one factory, a $(t+1)$ -th cycle expected assembly quantity of the at least one factory which has been determined at the $(t-1)$ -th cycle, said determined actual inventory quantity of the at least one factory for the start of the $(t+1)$ cycle, and said $(t+1)$ -th cycle shipment quantity of the at least one factory; and

determining a $(t+1)$ -th cycle total assembly quantity of the at least one factory by adding said $(t+1)$ -th cycle adjustment assembly quantity to said $(t+1)$ -th cycle expected assembly quantity of the at least one factory.

18. The method according to claim 1, wherein the predetermined cycle is a week.

19. A computer program product to be executed by a computer to achieve a method of managing production quantity in a distribution system where products shipped from at least one factory are stocked in a single delivery center at every predetermined cycle and then supplied to customers from the single delivery center, the method comprising:

determining a standard inventory quantity of products to be stocked in the single delivery center for a time of at least one predetermined cycle ahead based on a shipment record of the single delivery center; and

determining an assembly quantity of products to be assembled by the at least one factory for a time of at least one predetermined cycle ahead based on said determined standard inventory quantity and an actual inventory quantity of the at least one factory.

20. A production quantity management system for managing production quantity in a distribution system where products shipped from at least one factory are stocked in a single delivery center at every predetermined cycle and then supplied to customers from the single delivery center, comprising:

a plurality of storing systems that are respectively located in the single delivery center and the at least one factory to store information concerning an inventory and a shipment of the single delivery center and the at least one factory, respectively; and

a managing center that includes:

a calculating system that determines a standard inventory quantity of products to be stocked in the single delivery center for a time of at least one predetermined

cycle ahead based on a shipment record of the single delivery center and the information obtained from said plurality storing system; and

a management system that determines a total assembly quantity of products to be assembled by the at least one factory for a time of at least one predetermined cycle ahead based on said determined standard inventory quantity of the single delivery center and an actual inventory quantity of the at least one factory, and that sends the determined total assembly quantity to the at least one factory.

21. The production quantity management system according to claim 20,

wherein the at least one factory includes a plurality of factories,

wherein, with regard to a certain product, said management system determines the total assembly quantity for each of the plurality of factories according a number of the plurality of factories and a predetermined production proportion, and sends determined total assembly quantities to the respective factories.

22. The production quantity management system according to claim 20,

wherein said calculating system determines an approximation curve of variations of a shipment quantity of the single delivery center based on the shipment record of the single delivery center, and determines said standard inventory quantity of the single delivery center for the time one or more predetermined cycles ahead based on the determined approximation curve.

23. The production quantity management system according to claim 20,

wherein said calculating system determines a first approximation curve of variations of a shipment quantity of the single delivery center based on the shipment record of the single delivery center, determines a gradient of the shipment quantity of the single delivery center for a current cycle t based on the determined approximation curve, and determines a $(t+1)$ -th cycle standard inventory quantity of the single delivery center based on the determined gradient.

24. The production quantity management system according to claim 23,

wherein said calculating system determines said $(t+1)$ -th cycle standard inventory quantity of the single delivery center $dSI(t+1)$ for each product according to:

$$dSI(t+1) = dSI(t) + a \times \Omega$$

where "dSI(t)" represents a standard inventory quantity for a current cycle t, "a" represents the determined gradient, and Ω represents a factor which is predetermined according to a product type.

25. The production quantity management system according to claim 23,

wherein said calculating system further determines an (t+1)-th cycle expected shipment quantity of the single delivery center based on said determined (t+1)-th cycle standard inventory quantity of the single delivery center.

26. The production quantity management system according to claim 25,

wherein said calculating system further determines a (t+1)-th cycle standard inventory quantity of the at least one factory based on said determined (t+1)-th cycle standard inventory quantity of the single delivery center.

27. The production quantity management system according to claim 26,

wherein said calculating system determines each of said (t+1)-th cycle expected shipment quantity of the single delivery center and said (t+1)-th cycle standard

inventory quantity of the at least one factory by multiplying said (t+1)-th cycle standard inventory quantity of the single delivery center by a factor.

28. The production quantity management system according to claim 27, wherein the factor is $1/2$.

29. The production quantity management system according to claim 27,

wherein said calculating system determines:

a second approximation curve of variations of a shipment quantity of the single delivery center based on the shipment record of the single delivery center and said (t+1)-th cycle expected shipment quantity of the single delivery center;

a gradient of the shipment quantity of the single delivery center for the (t+1)-th cycle based on the determined second approximation curve;

a (t+2)-th cycle standard inventory quantity of the single delivery center based on the determined gradient for the (t+1)-th cycle; and

a (t+2)-th cycle expected shipment quantity of the single delivery center and a (t+2)-th cycle standard inventory quantity of the at least one factory based on said determined (t+2)-th cycle standard inventory quantity

of the single delivery center.

30. The production quantity management system according to claim 29,

wherein said calculating system determines said (t+2)-th cycle standard inventory quantity of the single delivery center $dSI(t+2)$ for each product according to:

$$dSI(t+2) = dSI(t+1) + b \times \Omega$$

where "dSI(t+1)" represents said (t+1)-th cycle standard inventory quantity of the single delivery center, "b" represents the determined gradient for the (t+1) cycle, and Ω represents a factor which is predetermined according to a product type.

31. The production quantity management system according to claim 30,

wherein said calculating system further determines a (t+1)-th cycle shipment quantity of the at least one factory based on said (t+2)-th cycle standard inventory quantity of the single delivery center, said (t+1)-th cycle standard inventory quantity of the single delivery center, an actual inventory quantity of the single delivery center for an end of the current cycle t, and a standard inventory quantity of the single delivery center for the current cycle t.

32. The production quantity management system according to claim 31,

wherein said calculating system further determines:

a third approximation curve of variations of the shipment quantity of the single delivery center based on said (t+1)-th cycle and (t+2)-th cycle expected shipment quantities of the single delivery center;

a gradient of the shipment quantity of the single delivery center for the (t+2)-th cycle based on the determined third approximation curve;

a (t+3)-th cycle standard inventory quantity of the single delivery center based on the determined gradient for the (t+2)-th cycle; and

a (t+3)-th cycle expected shipment quantity of the single delivery center and a (t+3)-th cycle standard inventory quantity of the at least one factory based on said determined (t+3)-th cycle standard inventory quantity of the single delivery center.

33. The production quantity management system according to claim 32,

wherein said calculating system determines said (t+3)-th cycle standard inventory quantity of the single delivery center $dSI(t+3)$ for each product according to:

$$dSI(t+3) = dSI(t+2) + c \times \Omega$$

where "c" represents the determined gradient for the (t+2) cycle.

34. The production quantity management system according to claim 33,

wherein said calculating system further determines a (t+2)-th cycle expected assembly quantity of the at least one factory based on said (t+3)-th cycle standard inventory quantity of the single delivery center, said (t+1)-th cycle expected shipment quantity of the single delivery center, said (t+2)-th cycle expected shipment quantity of the single delivery center, said actual inventory quantity of the single delivery center for the end of the current cycle t, said determined (t+1)-th cycle shipment quantity of the at least one factory, and a shipment quantity of the at least one factory for the current cycle t.

35. The production quantity management system according to claim 34,

wherein said calculating system further determines:

an actual inventory quantity of the at least one factory for a start of the (t+1) cycle based on an actual inventory quantity of the at least one factory for an end of the current cycle t;

a (t+1)-th cycle adjustment assembly quantity based on said (t+1)-th cycle standard inventory quantity of the at least one factory, a (t+1)-th cycle expected assembly quantity of the at least one factory which has been determined at the (t-1)-th cycle, said determined actual inventory quantity of the at least one factory for the start of the (t+1) cycle, and said (t+1)-th cycle shipment quantity of the at least one factory; and

a (t+1)-th cycle total assembly quantity of the at least one factory by adding said (t+1)-th cycle adjustment assembly quantity to said (t+1)-th cycle expected assembly quantity of the at least one factory.

36. The production quantity management system according to claim 20, wherein the predetermined cycle is a week.

37. The production quantity management system according to claim 20,

wherein said management center is located in the single delivery center and is connected to the plurality of storing systems located in the at least one factory through a network.

38. The production quantity management system according to claim 20,

wherein said management center is located in a site which is different from the at least one factory and the single delivery center, and is connected to the plurality of storing systems located in the at least one factory and the single delivery center through a network.